CLAIMS

1. A method of designing an alternating phase shifting mask (PSM), the method comprising:

converting a layout to an alternating PSM design including 0 degree phase shifters and 180 degree phase shifters; and

incorporating blockers in the alternating PSM design, wherein a blocker is formed in a 0 degree phase shifter to minimize an intensity imbalance with its corresponding 180 degree phase shifter.

2. The method of Claim 1, wherein incorporating blockers includes growing a length of the blocker.

3. The method of Claim 1, wherein incorporating blockers includes forming a plurality of blockers in the 0 degree phase shifter.

4. The method of Claim 1, wherein if a 180 degree phase shifter includes a sub-resolution feature, then sizing the blocker in the 0 degree phase shifter to be larger than the sub-resolution feature.

5. The method of Claim 1, wherein incorporating blockers creates a substantially uniform intensity imbalance error on the alternating PSM.

6. The method of Claim 1, further including performing optical proximity correction (OPC) on the alternating PSM design.

7. The method of Claim 6, wherein performing OPC is done after incorporating blockers in the alternating PSM design.

8. The method of Claim 6, wherein performing OPC is done before incorporating blockers in the alternating PSM design.

9. A method of generating an alternating phase shifting mask (PSM) design including 0 degree phase shifters and 180 degree phase shifters, the method comprising:

minimizing an intensity imbalance between a 0 degree phase shifter and a 180 degree phase shifter corresponding to the 0 degree phase shifter by incorporating a first sub-resolution feature in the 0 degree phase shifter.

10. The method of Claim 9, wherein incorporating the first sub-resolution feature includes growing a single dimension of the first sub-resolution feature.

11. The method of Claim 9, wherein incorporating the first sub-resolution feature includes forming a plurality of sub-resolution features in the 0 degree phase shifter.

12. The method of Claim 9, wherein if the 180 degree phase shifter includes a second sub-resolution feature, then sizing the first sub-resolution feature to be larger than the second sub-resolution feature.

13. The method of Claim 9, wherein incorporating the first sub-resolution feature for each 0 degree phase

shifter and 180 degree phase shifter of the alternating PSM creates a substantially uniform intensity imbalance error on the alternating PSM.

14. The method of Claim 9, further including performing optical proximity correction (OPC) on the alternating PSM design.

15. The method of Claim 14, wherein performing OPC is done after incorporating minimizing intensity imbalance.

16. The method of Claim 14, wherein performing OPC is done before incorporating minimizing intensity imbalance.

17. An alternating phase shifting mask (PSM) comprising:

a 180 degree phase shifter;

a 0 degree phase shifter corresponding to the 180 degree phase shifter; and

at least one sub-resolution feature formed in the 0 degree phase shifter to minimize an intensity imbalance with the 180 degree phase shifter.

18. The alternating PSM of Claim 17, further including an undercut in the 180 degree phase shifter.

19. The alternating PSM of Claim 17, further including a bias in the 180 degree phase shifter.

20. The alternating PSM of Claim 17, further including a sub-resolution feature formed in the 180 degree phase shifter, wherein the sub-resolution feature formed in

the 0 degree phase shifter is larger than the sub-resolution feature formed in the 180 degree phase shifter.

21. A computer-implemented system for generating an alternating phase shifting mask (PSM) design, the alternating PSM design including 0 degree phase shifters and 180 degree phase shifters, the system comprising:

an input interface for receiving a layout;

means for converting the layout to the alternating PSM design, wherein the alternating PSM design includes a blocker formed in a 0 degree phase shifter to minimize an intensity imbalance with a corresponding 180 degree phase shifter; and

an output interface for outputting the alternating PSM design.

22. The computer-implemented system of Claim 21, wherein the means for converting includes software code for increasing a dimension of the blocker to improve the intensity imbalance.

23. The computer-implemented system of Claim 21, wherein the means for converting includes software code for creating a uniform intensity imbalance error on the alternating PSM using a plurality of blockers.

24. The computer-implemented system of Claim 21, wherein the means for converting includes software code for performing optical proximity correction (OPC) on the alternating PSM design.

25. A method of manufacturing an alternating phase shifting mask (PSM), the method comprising:

using a software-implemented technique to create a uniform intensity imbalance error on the alternating PSM; and

using a mask-implemented technique to correct for the uniform intensity imbalance error on the alternating PSM.